UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,601	04/07/2006	Takuma Sawatani	0020-5397PUS1	8968

2292 7590 10/11/2007

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
CHEN, SHIH CHAO	

ART UNIT	PAPER NUMBER
2821	

NOTIFICATION DATE	DELIVERY MODE
10/11/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/541,601	Applicant(s) SAWATANI ET AL.	
	Examiner Shih-Chao Chen	Art Unit 2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 July 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :7/7/05, 10/7/05, 12/29/06, 2/8/07, 2/28/07.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 7/7/05, 10/7/05, 12/29/06, 2/8/07 & 2/28/07 has considered by the examiner.

Drawings

3. Figure 51-52 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claim 12 is objected to because of the following informalities: in lines 1-2, "The array antenna controller as claimed in any one of claims 1-9, claim 1" should be changed to --The array antenna controller as claimed in claim 1--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 6,11, 13 and 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 6 recites the limitation " the bit error rate, the frame error rate, and the packet error rate " in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 11 recites the limitation "the first reactance set" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 11 recites the limitation "said second reactance set" in line 5. There is insufficient antecedent basis for this limitation in the claim.

10. Claim 13 recites the limitation "the input impedance" in line 8. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 16 recites the limitation "the plurality of reactance sets" in line 5. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 17 recites the limitation "the plurality of reactance sets" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohira et al. (U.S. Patent No. 6,407,719).

Regarding claim 1, Ohira et al. teaches in figures 1-11 a controller [100] for controlling an array antenna [6, 7], the array antenna comprising: a radiating element [6] for receiving a transmitted radio signal; a plurality of parasitic elements [7] each provided to be distant from the radiating element at a predetermined interval [d]; and a plurality of variable reactance elements [23] connected to the parasitic elements, respectively, wherein the controller changes reactances [X_n] to be set to the variable reactance elements, respectively, so that the parasitic elements operate as waveguides or reflectors, thereby changing a directivity characteristic of the array antenna, wherein the controller [100] comprising: a control device (i.e. a digital computer, for example; See col. 3, lines 35-38) for selecting one reactance set from among a plurality of reactance sets in a plurality of cases (See TABLE 1-2) of setting the plurality of reactance sets, respectively so as to be able to obtain a diversity gain equal to or larger than a predetermined value, based on the radio signal received by the array antenna, based on a signal quality of the radio signal received in each of the plurality of cases according to a predetermined selection criterion, and for setting the selected reactance set to the plurality of variable reactance elements, respectively.

Regarding claim 2, Ohira et al. teaches in figures 1-11 the array antenna controller [100] as claimed in claim 1, wherein the plurality of cases [cases 1-4] are of

setting the plurality of reactance sets so as to be able to obtain a diversity gain equal to or larger than a predetermined value, and so as to keep an input impedance [Z_n] of the array antenna substantially unchanged, based on the radio signal received by the array antenna.

Regarding claim 3, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the signal quality of the radio signal is estimated using a signal power [30].

Regarding claim 4, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the selection criterion (See TABLE 1-4) is such that the signal quality of the radio signal received in each of the plurality of cases [cases 1-4] is equal to or larger than a predetermined threshold.

Regarding claim 5, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the selection criterion is such that, when the signal quality of the radio signal received in each of a plurality of cases is a signal power [30], then a reactance set, as obtained when the signal quality is a maximum, is selected.

Regarding claim 6, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the selection criterion is such that, when the signal quality of the radio signal received in each of the plurality of cases is one of the bit error rate, the frame error rate, and the packet error rate, then a reactance set, as obtained when the signal quality is a minimum, is selected.

Regarding claim 7, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the control device (i.e. computer device) arbitrarily selects one reactance set from among the plurality of reactance sets when the signal quality of the radio signal received in each of the plurality of cases [cases 1-4] is smaller than a predetermined threshold, and repeats the selection processing until the signal quality reaches a predetermined selection criterion for the selected reactance set.

Regarding claim 8, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the control device (i.e. computer device) selects one reactance set in a predetermined order from among the plurality of reactance sets when the signal quality of the radio signal received in each of the plurality of cases is smaller than a predetermined threshold, and repeats the selection processing until the signal quality reaches a predetermined selection criterion for the selected reactance set.

Regarding claim 9, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the control device (i.e. computer device) switches over the plurality of cases [case 1-4] with changing a threshold in a predetermined range, and sets as the threshold, a threshold as obtained when the signal quality of the radio signal satisfies a predetermined selection criterion.

Regarding claim 10, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna [6, 7] comprises an even number of parasitic elements [A1-A6] and an even number of variable reactance elements [27], wherein the even number of parasitic elements includes at least one first

set of parasitic elements and at least one second set of parasitic elements, wherein the even number of variable reactance elements include a first set of variable reactance elements connected to the first set of parasitic elements, respectively, and a second set of variable reactance elements connected to the second set of parasitic elements, respectively, wherein the plurality of cases include a first case [case 1] in which the first reactance set is set to the first and second sets of variable reactance elements, and a second case [case 2] in which the second reactance set is set to the first and second sets of variable reactance elements, and wherein the control device (i.e. computer device) selects one reactance set based on the signal quality of the radio signal received in each of the first and second cases, and sets the selected reactance set to the first and second sets of variable reactance elements (See TABLE 1-2).

Regarding claim 11, Ohira et al. teaches in figures 1-11 The array antenna controller as claimed in claim 1, wherein the array antenna comprises first and second parasitic elements [A1-A2], the first reactance set includes reactances Xa and Xb which are set to the first and second parasitic elements, and the second reactance set includes the reactances Xb and Xa which are set to the first and second parasitic elements.

Regarding claim 12, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna [6, 7] comprises a plurality of parasitic elements [A1-A6] each being distant from the radiating element [A0] at a predetermined interval [d], and the parasitic elements are provided at substantially

equal angle [60 degree] relative to each other, and wherein the plurality of cases [case 1-4] include a case in which a plurality of reactance sets obtained by circulating respective reactances are set so as to be able to obtain a diversity gain equal to or larger than a predetermined value, based on the radio signal received by the array antenna.

Regarding claim 13, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna [6-7] includes a plurality of parasitic elements [A1-A6] each being distant from the radiating element at a predetermined interval [d], and the parasitic elements are provided at substantially equal angle [60 degree] relative to each other, and wherein the plurality of cases [case 1-4] include a case in which a plurality of reactance sets obtained by circulating respective reactances are set so as to be able to obtain a diversity gain equal to or larger than a predetermined value and so as to keep the input impedance of the array antenna substantially unchanged, based on the radio signal received by the array antenna.

Regarding claim 14, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna comprises: at least one pair of parasitic elements [A1, A4] provided linearly symmetrically about a symmetric line that serves as a symmetric axis, and that passes through a position of the radiating element [A0]; and a plurality of parasitic elements [A2, A5 & A3, A6} provided either one of to be located on the symmetric line and to be linearly symmetric about the symmetric line serving as the symmetric axis, and wherein the plurality of cases [case 1-4] include

at least two cases in which a plurality of reactance sets obtained by replacing reactances of at least one pair of parasitic elements provided linearly symmetrically with each other are set so as to be able to obtain a diversity gain equal to or larger than a predetermined value, based on the radio signal received by the array antenna.

Regarding claim 15, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna comprises: at least one pair of parasitic elements [A1, A4] provided linearly symmetrically about a symmetric line that serves as a symmetric axis, and that passes through a position of the radiating element; and a plurality of parasitic elements [A2, A5 & A3. A6] provided either one of to be located on the symmetric line and to be linearly symmetric about the symmetric line serving as the symmetric axis, and wherein the plurality of cases [case 1-4] include at least two cases in which a plurality of reactance sets [Z_1 –Z_6] obtained by replacing reactances of at least one pair of parasitic elements provided linearly symmetrically with each other are set so as to be able to obtain a diversity gain equal to or larger than a predetermined value, and so as to keep the input impedance of the array antenna substantially unchanged, based on the radio signal received by said array antenna.

Regarding claim 16, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein when a CDF, which is a cumulative probability of such an event as a signal power [30] of the received radio signal exceeding a predetermined signal power, is a predetermined value, the plurality of reactance sets are set so that the diversity gain is substantially a maximum.

Regarding claim 17, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein when a CDF, which is a cumulative probability of such an event as a signal power [30] of the received radio signal exceeding a predetermined signal power, is a predetermined value, the plurality of reactance sets are set so that the diversity gain is equal to or larger than a predetermined value.

Regarding claim 18, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 1, wherein the array antenna comprises: one radiating element [A0]; and two parasitic elements [A1, A4] between which the radiating element is provided, and which are provided linearly together with the radiating element.

Regarding claim 19, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 18, wherein a distance [d] between the radiating element [A0] and each of the parasitic elements [A1, A4] is set to one of lengths which are 0.1 to 0.35 times as large as a wavelength of the received radio signal.

Regarding claim 20, Ohira et al. teaches in figures 1-11 the array antenna controller as claimed in claim 18, wherein the array antenna comprises: a dielectric substrate [10] including first and second surfaces parallel to each other; a grounding electrical conductor [11] formed on a predetermined first region on the second surface of the dielectric substrate; and three strip electrical conductors [A1, A0, A4] formed on the first surface of the dielectric substrate, the three strip electrical conductors being formed to have a predetermined length so as to protrude from a region opposite to the first region, and to be provided at predetermined interval [d], the three strip electrical

conductors operating as the radiating element [A0] and the two parasitic elements [A1, A4], respectively.

Regarding claim 21, Ohira et al. teaches in figures 1-11 an array antenna apparatus comprising: one radiating element [A0]; two parasitic elements [A1, A4] between which the radiating element is provided, and the two parasitic elements being provided linearly together with the radiating element; and two variable reactance elements [23] connected to the parasitic elements, respectively, wherein the array antenna apparatus changes reactances [X_n] which are set to the respective variable reactance elements, so that the parasitic elements operate as waveguides or reflectors, thereby changing a directivity characteristic of the array antenna apparatus, wherein the array antenna apparatus further comprises: a dielectric substrate [10] including first and second surface parallel to each other; a grounding electrical conductor [11] formed on a predetermined first region on the second surface of the dielectric substrate; and three strip electrical conductors [A1, A0, A4] formed on the first surface of the dielectric substrate, the three strip electrical conductors being formed to have a predetermined length so as to protrude from a region opposite to the first region, and the three strip electrical conductors being provided at a predetermined interval [d], and operating as the radiating element [A0] and the two parasitic elements [A1, A4], respectively.

Regarding claim 22, Ohira et al. teaches in figures 1-11 the array antenna apparatus as claimed in claim 21, wherein a distance [d] between the radiating element [A0] and each of the parasitic elements [A1, A4] is set to one of lengths which are 0.1 to

0.35 times as large as a wavelength of a received radio signal.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-Chao Chen whose telephone number is (571) 272-1819. The examiner can normally be reached on Monday-Thursday from 7 AM to 5:30 PM, Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas W. Owens can be reached on (571) 272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Shih-Chao Chen
Primary Examiner
Art Unit 2821

Shih-Chao Chen
SHIH-CHAO CHEN
PRIMARY EXAMINER

SXC

September 25, 2007